Canon

CXDI Image Processing Software

MLT (M)

User’s Manual

Before using the instrument, be sure to read this manual thoroughly.
Also, read the manuals of other instruments in this system.
Keep the manual where it is easily accessible.

Please Note

1. In no event will Canon be liable for direct or indirect consequential damage arising out of the use of this product. Canon will not be liable for loss of image data due to any reason.

2. Please have this product installed by Canon representative or distributor.

3. Canon reserves the right to change the specifications of the product without prior notice.

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Contents

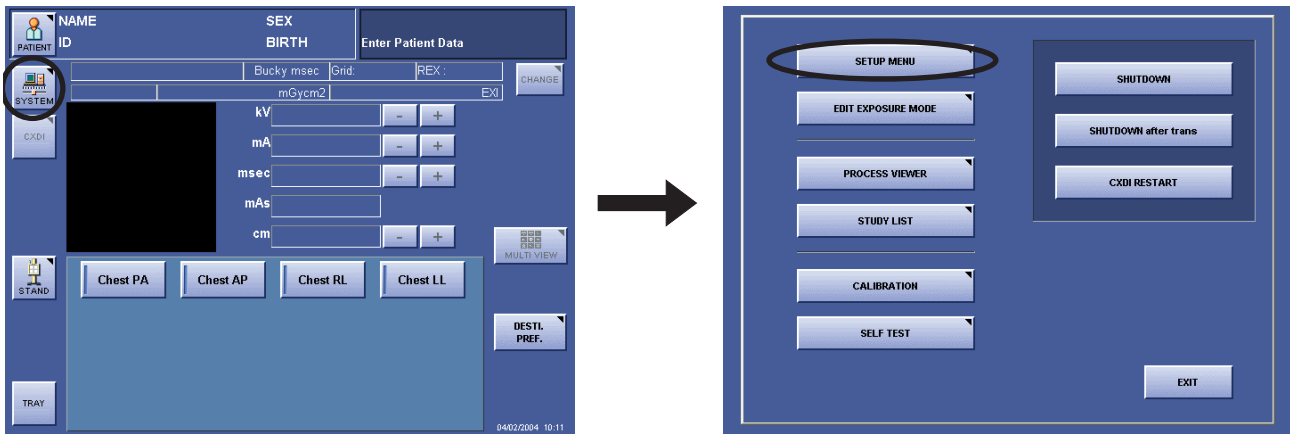
1. Overview 1
1.1 About MLT (M) 1
1.2 Available Functions of MLT (M) 2
2. Edit Exposure Mode Settings 3
2.1 Procedures to Set Exposure Mode 3
2.2 Setting LAP. ENHANCE. Tab 7
3. QA Mode Settings 8
3.1 Procedures to Change Parameters 8
3.2 Changing LAP. ENHANCE. Tab 11
4. QA Parameters 12

Notation Conventions

Notation 1

In this manual, the name of button is enclosed with a pair of brackets [ ], and the buttons that are selected in succession are connected with > to indicate the order.

Example:	On the Exposure screen, touch the followings: [SYSTEM] > [SETUP MENU]
Operation:	Touch the SYSTEM button on the first screen, and then touch the SETUP MENU button on the second screen.



Touch the SYSTEM button (left), and touch the SETUP MENU button (right)

Notation 2

If any detailed explanation for the operation or setting is available on other page in this manual, the page to refer is indicated with (→ page number).

Example:	For details of the DYNAMIC RANGE parameter, refer to the step 2 in 2.2 Setting LAP. ENHANCE. Tab (→ P.7).
Content:	On page 7, detailed description of the EFFECT feature is provided.

Notation 3

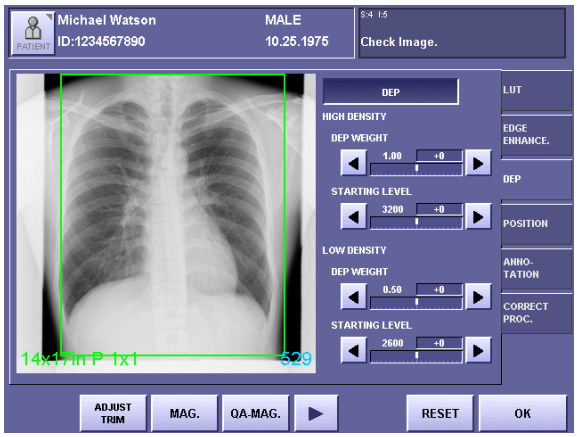
When description of the procedure or setting continues from an odd-numbered page (right page) to the subsequent even-numbered page (left page), a small note, [Continued on the following page »] appears at the bottom-right of the odd-numbered page to draw your attention.

1. Overview

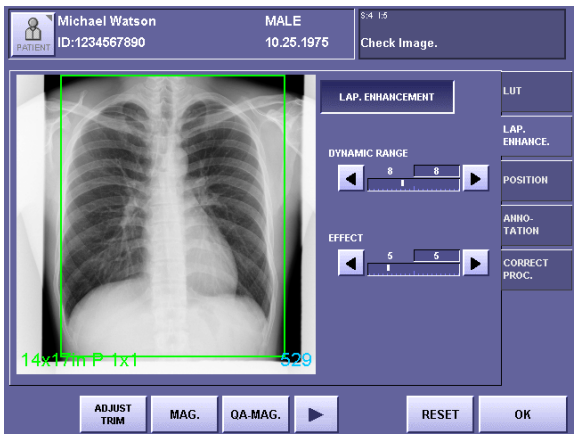
1.1 About MLT (M)

NOTE: MLT (M) is supported by CXDI System Software Version 5.1 or later.

The CXDI Image Processing Software MLT (M) (called “MLT (M)” in this manual) is designed to extend the image processing functions provided with the CXDI series of Canon digital radiography system (called “CXDI” in this manual).
By installing MLT (M) on the Control PC, the advanced image processing features of MLT (M) are brought into full scope both in the Edit Exposure Mode and QA Mode.
The following examples show the QA Mode screens of CXDI System Software version 6.3.



Standard QA Mode Screen (DEP Tab)



QA Mode Screen Extended by MLT (M) (LAP. ENHANCE. Tab)

1.2 Available Functions of MLT (M)

This manual describes the operating procedures of the following image processing function that is available with MLT (M). For details and information on other image processing functions, please refer to Operation Manual and Setup Guide.

Laplacian Edge Enhancement (→ P.7)

The Lap. ENHANCE. tab provides the function to accentuate edge details of the exposure image by specifying the two parameters; the adjustment level of dynamic range (DYNAMIC RANGE), and degree of enhancement (EFFECT).

NOTE: The effects resulting from changes to the parameters may be difficult to check in the exposure image of the QA mode screen.
In these cases, check by touching [MAG.] or [QA-MAG.] to display the enlarged screen.

Display of the Tabs

At the time of installation, the service person can specify the fixed parameters, and set MLT (M) not to display the tab for the settings of Laplacian Edge Enhancement.

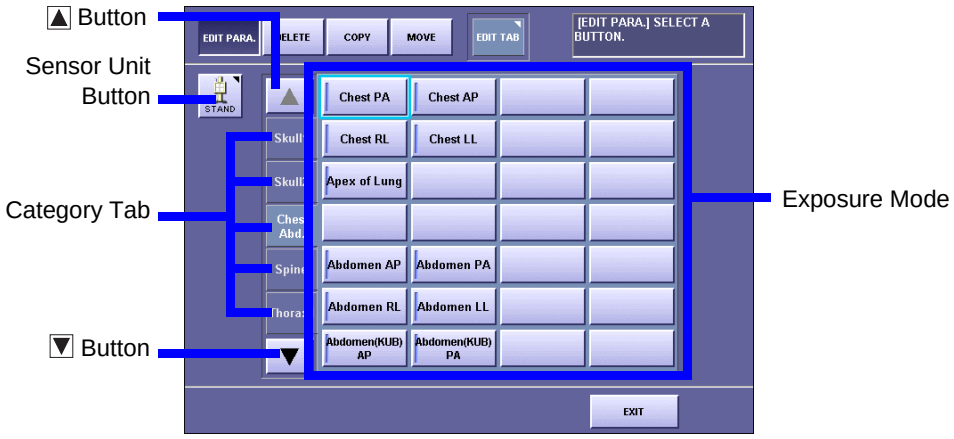
2. Edit Exposure Mode Settings

The examples used in this chapter are the screens of CXDI System Software version 6.3.

2.1 Procedures to Set Exposure Mode

1 Display the Edit Exposure Mode screen

On the Exposure screen, touch the followings:
[SYSTEM] > [EDIT EXPOSURE MODE]



Edit Exposure Mode Screen

2 Select the Sensor Unit

If two or more sensor units are being used in the system, touch the Sensor Unit button, then select the Sensor Unit.

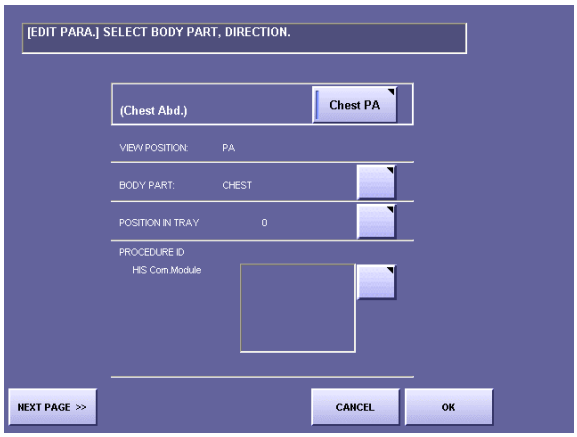
3 Select the Category tab

If eight or more categories are registered in the system, touch the ▲ or ▼ button to display the Category tabs that are not currently visible.

Continued on the following page >>

4 Select the Exposure Mode

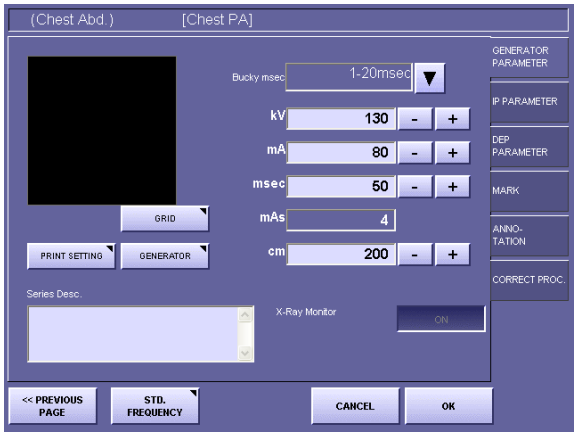
Make sure that [EDIT PARA.] at the top-left is displayed in highlight, then select the desired Exposure Mode.
The EDIT PARA. screen appears.



EDIT PARA. Screen (first page)

5 Display the next page

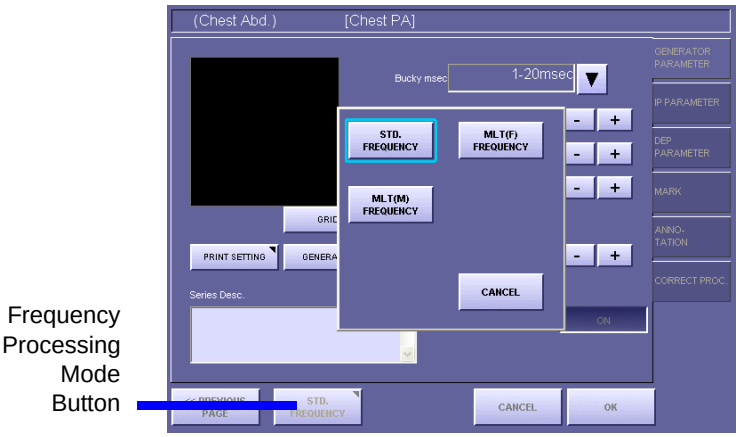
Touch [NEXT PAGE].



EDIT PARA. Screen (second page)

6 Select MLT (M) FREQUENCY

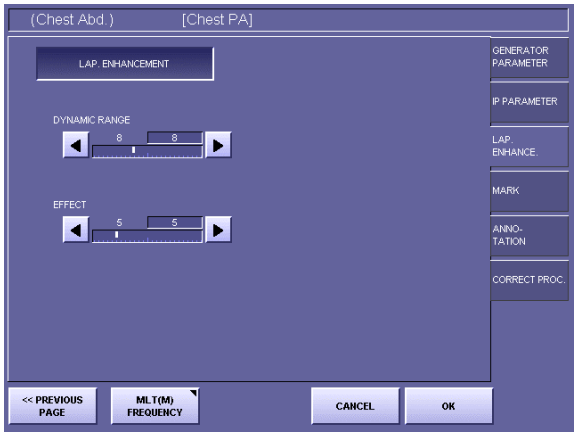
If MLT (M) FREQUENCY is not currently selected (in this case, the LAP. ENHANCE. tab is not displayed), touch the Frequency Processing Mode button to open the window, then touch [MLT (M) FREQUECY].



Frequency Processing Mode Window

7 Select the tab

Touch the LAP. ENHANCE. tab.



LAP. ENHANCE Screen

8 Set the parameters

Set the parameters, referring to the description of 2.2 Setting LAP. ENHANCE. Tab (→ P.7).

Continued on the following page >>

9 Save the parameters

Touch [OK]. The window displaying the following message appears:
Save the changed parameter.
Then, touch [OK].

MEMO

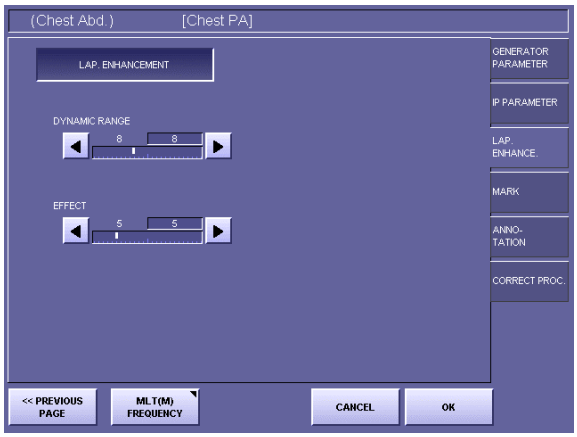
When Password is required

If the password is specified, a different message is displayed in the window as follows:
Administrator's authority is needed. Enter system password.
In this case, touch anywhere within the frame to display On-Screen-Keyboard, type your password, then touch [OK].

2.2 Setting LAP. ENHANCE. Tab

1 Set the Laplacian Edge Enhancement effective

Touch [LAP. ENHANCEMENT] to display the parameters. The appearance of the button switches over between the highlight (in white outline characters against a colored background) and normal display each time you touch the button. The parameters are available when the button is displayed in highlight.



LAP. ENHANCE. Screen with Parameters

2 Set the DYNAMIC RANGE parameter

Touch the ◀ or ▶ button, and set the value within the range between 1 to 20.
The value on the left is the setting saved previously, and the value on the right is the current setting.
The value indicates the adjustment level of dynamic range.
Select a larger value for higher level of adjustment, select a smaller value for lower level of adjustment.

3 Set the EFFECT parameter

Touch the ◀ or ▶ button, and set the value within the range between 1 to 20.
The value on the left is the setting saved previously, and the value on the right is the current setting.
The value indicates the degree of edge enhancement.
Select a larger value for higher degree of enhancement, and select a smaller value for lower degree of enhancement.

NOTE: If the EFFECT parameter is set to an excessive value, artifacts may occur in the image, or the effective data of the exposure image may be damaged. Check the exposure image, and if the results of enhancement appear to be too strong, either set the parameter to a smaller value, or set the Laplacian Edge Enhancement not effective.

3. QA Mode Settings

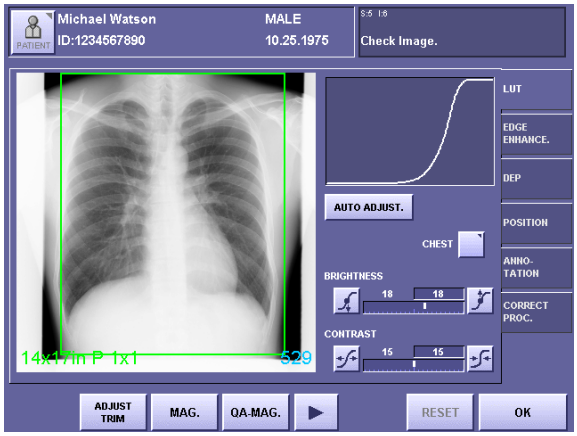
The examples used in this chapter are the screens of CXDI System Software version 6.3.

3.1 Procedures to Change Parameters

Image processing of exposure image with CXDI is called QA (Quality Assurance) Processing, and can be performed by adjusting the parameters on the QA Mode screen to optimize the exposure image.

1 Display the QA Mode screen

Display the QA Mode screen by one of the following methods:



QA Mode Screen

To display the QA Mode screen automatically right after x-ray exposure

On the Exposure screen, touch the followings to display the DISPLAYING PARAMETER CHANGE/QA SCREEN DURING EXPOSURE screen:
[SYSTEM] > [SETUP MENU] > [SYSTEM SETUP] > [DISPLAYING PARAMETER CHANGE/QA SCREEN DURING EXPOSURE]
Then set the QA Mode screen effective

To perform QA Processing right after x-ray exposure

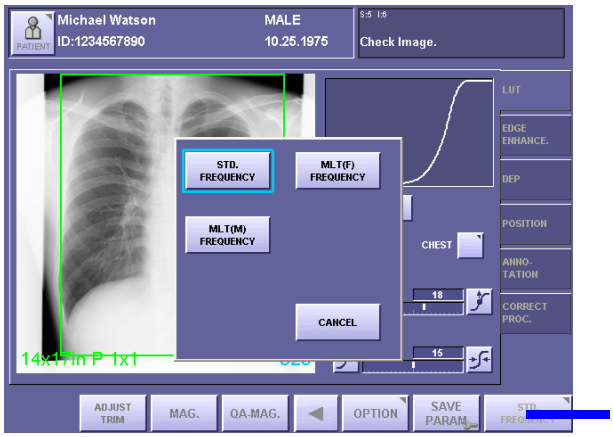
Touch [QA] on the Preview screen.

To perform QA Processing after examination

Select the exposure image from the Study List, display the selected image, then touch [QA].

2 Select MLT (M) FREQUENCY

If MLT (M) FREQUENCY is not currently selected (in this case, the LAP. ENHANCE. tab is not displayed), touch the Frequency Processing Mode button to open the window, then touch [MLT (M) FREQUECY].

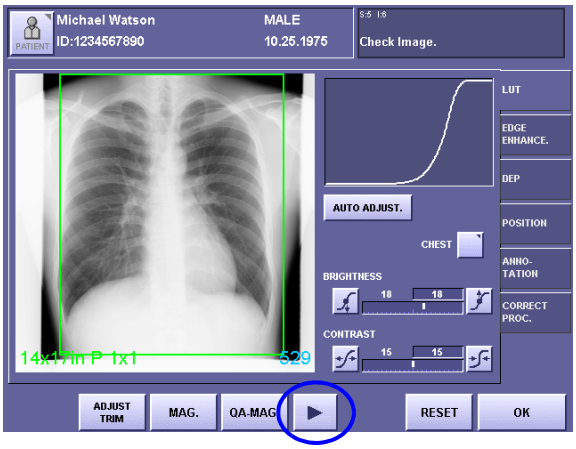


Frequency Processing Mode Window

MEMO

When the Frequency Processing Mode button is not visible

If the Frequency Processing Mode button is not displayed on the screen, touch the ▶ button at the bottom part of the screen.



3 Select the tab

Touch the LAP. ENHANCE. tab.

4 Change the parameters

Set the parameters, referring to the description of 3.2 Changing LAP. ENHANCE. Tab (→ P.11).

Continued on the following page >>

5 Save the new parameters

To save new parameters as the default values of the Exposure Mode (except opening from Study List), touch [SAVE PARAM]. The window displaying the following message appears:
Are you sure you want to change the default generator parameters?
Then, touch [YES].

MEMO

When Password is required

If the password is specified, a different message is displayed as follows:
Administrator's authority is needed. Enter system password.
In this case, touch within the frame to display On-Screen-Keyboard, type your password, then touch [OK].

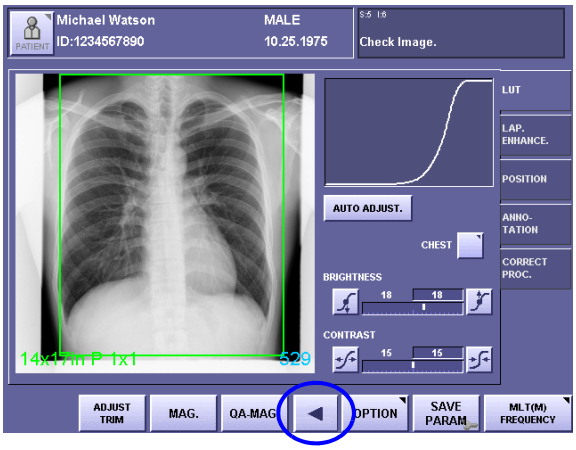
6 Close the QA Mode screen

Touch [OK].

MEMO

When [OK] is not visible on the screen

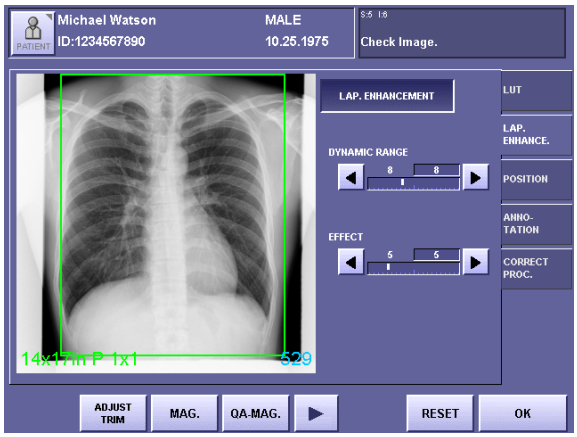
If [OK] is not displayed on the screen, touch the ◀ button at the bottom part of the screen.



3.2 Changing LAP. ENHANCE. Tab

1 Set the Laplacian Edge Enhancement effective

Touch [LAP. ENHANCEMENT] to display the parameters. The appearance of the button switches over between the highlight (in white outline characters against a colored background) and normal display each time you touch the button. The parameters are available when the button is displayed in highlight.



LAP. ENHANCE. Screen with Parameters

2 Set the DYNAMIC RANGE parameter

Touch the ◀ or ▶ button, and set the value within the range between 1 to 20.
The value on the left is the setting saved previously, and the value on the right is the current setting.
For details of the DYNAMIC RANGE parameter, refer to the step 2 in 2.2 Setting LAP. ENHANCE. Tab (→ P.7).

3 Set the EFFECT parameter

Touch the ◀ or ▶ button, and set the value within the range between 1 to 20.
The value on the left is the setting saved previously, and the value on the right is the current setting.
For details of the EFFECT parameter, refer to the step 3 in 2.2 Setting LAP. ENHANCE. Tab (→ P.7).

NOTE: If the EFFECT parameter is set to an excessive value, artifacts may occur in the image, or the effective data of the exposure image may be damaged. Check the exposure image, and if the results of enhancement appear to be too strong, either set the parameter to a smaller value, or set the *Laplacian Edge Enhancement* not effective.

4. QA Parameters

When MLT(M) frequency processing is selected, the QA parameters (%IP_PARAM%) in Annotation are displayed in the format below.

REX680	Q2	W10	LP8	GCS16,10	R	RT+90	Z0	C0	M2,1,2
1	2	3	4	5	6	7	8	9	10

n stands for the numeric value, or symbol displayed on Annotation.

1 REX
The parameter is displayed as follows:
REXn
If LUT is set to REX ADJUST for exposure, **F-REX** is displayed.

2 Frequency Processing Mode
If MLT (M) FREQUENCY is selected as the Frequency Processing Mode, **Q2** is displayed. **Q0** is displayed for STD. FREQUENCY, and **Q1** is displayed for MLT (F) FREQUENCY. For other QA parameters displayed when the mode other than MLT (M) Frequency Processing is selected, please refer to the respective manuals.

3 Dynamic Range Adjustment
The parameter is displayed as follows:
Wn (DYMAMIC RANGE)
If the Laplacian Edge Enhancement is not effective, nothing is displayed.
If the image is generated by the system software version 5.0 or earlier, this parameter is displayed as **W***.

4 Laplacian Edge Enhancement
The parameter is displayed as follows:
LPn (EFFECT)
If the Laplacian Edge Enhancement is not effective, nothing is displayed.

5 LUT Parameters

The parameters are displayed as follows:
Gn (CURVE SHAPE) **n** (BRIGHTNESS)**, n** (CONTRAST)
The Curve Shapes are represented by the following symbols respectively:
CS: CHEST, **SS**: STAN. CONTRAST, **LI**: LINEAR, **IL**: INV. LINEAR,
BS: BONE #1, **GS**: BONE #2
The display values correspond to the actual values as shown in the following table (the values for CONTRAST are omitted):

BRIGHTNESS

Display Value	1	2	3	4	5	6	7	8	9	10
Density	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
Display Value	11	12	13	14	15	16	17	18	19	20
Density	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2
Display Value	21	22	23	24	25	26	27	28	29	
Density	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	

6 Flip

Either or both of the following parameters is/are displayed:
R (Flip Horizontal), **U** (Flip Vertical)
If image is not flipped, nothing is displayed.

7 Rotate

The parameter is displayed as follows:
RTn (Rotate Angle)
The degree of rotation is available from **+90**, **-90**, **+180**.
If image is not rotated, nothing is displayed.

8 Suppress Grid Processing

One of the following parameters is displayed:
Z0 (No grid stripe is detected), **Z1** (Grid stripes are suppressed), **Z*** (Processing is not determined yet)
If the Grid Reduction Processing is not effective, nothing is displayed.

9 High-Density Clipping Processing (HIGH IN. CLIPPING)

One of the following parameters is displayed:
C0 (Clipping is not performed), **C1** (Clipping is performed), **C*** (Processing is not determined yet)
If the High-Density Clipping Processing is not effective, nothing is displayed.

Continued on the following page >>

10 Dose-Depend Processing (D. DEPEND MTF IMP)
One of the following parameters is displayed:
M0 (Processing is not performed), **M1** (Processing is performed in the fix mode), **M2,n,n** (Processing is performed in the dose dependent mode)
The parameters for **M2** are displayed as follows:
M2, n (FILTER TYPE Index)**, n** (INTENSITY Index)
The display values correspond to the parts of the body as shown in the following table (the values for INTENSITY are omitted):

Filter Type

Display Value	1	2	3	4	5	6	7
Body Part	Chest	Abdo-men	Skull	Cervical vertebrae	Thoracic vertebra	Lumbar	Limbs

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